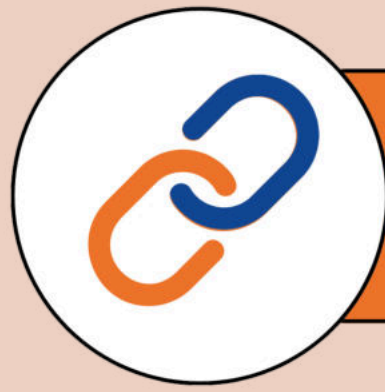


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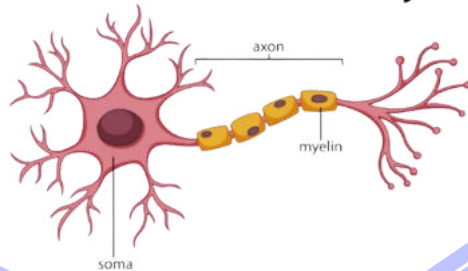
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1. Consider the following statements about DRDO and ISRO:

- Both DRDO and ISRO come under the Ministry of Defence.
- The Motto of DRDO is "Balasya Mulam Vigyanam".
- DRDO was formed in 1958.
- ISRO is the premier defence agency of India.

Which of the above statements is/are False?

- Only 1 & 2
- Only 2, 3 & 4
- Only 1 & 4
- Only 2 & 4
- Question not attempted

Answer: (C)

Explanation:

Parameter	DRDO	ISRO
Type of Institution	Defence R&D wing	Space agency
Dept./Ministry	Ministry of Defence	Dept. of Space (under PMO)
Establishment	1958 (merger of Technical Development Establishment (TDE - Indian Army) and Directorate of Technical Development & Production (DTDP - Defence Science Organisation))	15 August, 1969 in place of INCOSPAR (which was set up in 1962)
Motto	Balasya Mulam Vigyanam	Space technology in the service of mankind.
HQ	New Delhi	Bangalore

Institutes related to ISRO

Indian Institute of Space Science and Technology (IIST)	Thiruvananthapuram, Kerala
Physical Research Laboratory (PRL)	Ahmedabad, Gujarat
Indian Institute of Remote Sensing (IIRS)	Dehradun, Uttarakhand
Space Applications Centre (SAC)	Ahmedabad, Gujarat
Liquid Propulsion Systems Centre (LPSC)	Valiamala, Thiruvananthapuram
Vikram Sarabhai Space Centre (VSSC)	Thiruvananthapuram
Satish Dhawan Space Centre (SDSC)	Sriharikota, Andhra Pradesh

Centre for Space Science and Technology Education in Asia-Pacific (CSSTEAP)	Dehradun, Uttarakhand
ISRO Propulsion Complex	Mahendra Giri, Tamil Nadu
North-Eastern Space Applications Centre (NE-SAC)	Umiam, Meghalaya
UR Rao satellite centre (URSC)	Bengaluru

ISRO related centers in Rajasthan

Western RRSC – Regional Remote Sensing Center	Jodhpur
Solar Observatory	Udaipur
Infrared Observatory	Mount Abu

2. Which of the following statements is false about the Integrated Guided Missile Development Programme?

- It was started in 1983.
- This programme was headed by Dr. APJ Abdul Kalam.
- Five ballistic missiles were developed under this programme.
- Agni, Prithvi, Shourya, Akash and Nag are five missiles.
- Question not attempted

Answer : (D)

Explanation:

Integrated Guided Missile Development Programme

- ❖ It was conceived by renowned scientist **Dr APJ Abdul Kalam** to enable India attain **self-sufficiency in the field of missile technology.**
- ❖ It got the approval from GoI on July 26, **1983.**
- ❖ The missiles developed under the programme were:
 - **Prithvi** (Short range surface to surface ballistic missile)
 - **Agni** (Intermediate-range surface to surface ballistic missile)
 - **Trishul** (Short range low level surface to air missile)
 - **Akash** (Medium range surface to air missile)
 - **Nag** (Third generation anti tank guided missile)
- ❖ After achieving the goal of making India self-reliant in missile technology, DRDO on January 8, **2008**, formally announced successful **completion of IGMDP.**



3. Which one of the following missiles is India's first anti-radiation missile?

- (A) Astra
- (B) Dhruvastra
- (C) Nag
- (D) RudraM
- (E) Question not attempted

Answer : (D)

Explanation : India's first indigenously developed New Generation Anti Radiation Missile (**NGARM/RudraM-I**) was successfully flight tested on 02 May 2024 in Chandan Range, Rajasthan.

RudraM Missile

- ❖ India's **first** indigenously developed New Generation **Anti Radiation Missile**.
- ❖ **Developed by - DRDO**
 - Defence Research & Development Laboratory (DRDL), Hyderabad
- ❖ It is an anti-radiation missile with the role of Suppression of Enemy Air Defenses (**SEAD**) missions. It neutralizes many types of enemy assets.
- ❖ **Air to Surface** Missile (Solid propelled air launched from Sukhoi-30 MKI fighter aircraft).
- ❖ Range - **150 Km**

- ❖ DRDO successfully flight-tested the **RudraM-II** off the Coast of Odisha on 29 May 2024.
 - Range - **350 Km**

AGM-88 HARM

- ❖ USA's Air to Surface High-Speed Anti Radiation missile.

Anti - Radiation Missile

- ❖ These are designed to detect, track and neutralize the adversary's radar, communication assets and other radio frequency sources, which are generally part of their air defence systems.



4. With reference to the 'National Space Day 2024', consider the following statements:

1. It is the second National Space Day, which was celebrated on August 23, 2024.
2. The theme for the day this year was "Touching lives while touching the Moon: India's Space Saga".
3. The day is celebrated to honor Vikram Sarabhai on his birth anniversary.

Which of the following statements given above is/are correct?

- (A) Only 1 and 3
- (B) Only 2
- (C) Only 2 and 3
- (D) 1, 2 and 3
- (E) Question not attempted

Answer: (B)

Explanation:

National Space Day 2024

- ❖ India is celebrating its **maiden** National Space Day [NSpD-2024] on **August 23, 2024**.
- ❖ **Theme :** "Touching Lives while Touching the Moon: India's Space Saga."
- ❖ India became the **fourth country to land on the moon** and the **first to reach its southern polar region** on August 23, 2023. To honour this landmark achievement, Hon'ble Prime Minister Shri Narendra Modi announced August 23 as "National Space Day".
- ❖ The day is celebrated to **honor India's achievements in space exploration** and to look forward to the future of space exploration.

Dr. Vikram Sarabhai

- ❖ Father of Indian Space Program.
- ❖ Founder of ISRO.



- ❖ CRISPR is a powerful **tool for editing genomes**, allowing researchers to easily alter DNA sequences and modify gene function.
- ❖ **Protein Cas9** is an **enzyme** that acts like a pair of **molecular scissors**, capable of cutting strands of DNA.

23. What is the range of nanoscale?
 (A) 10^{-9} - 10^{-7} m
 (B) 10-100 nm
 (C) 100-1000 nm
 (D) 1-1000 nm
 (E) Question not attempted

Answer: (A)

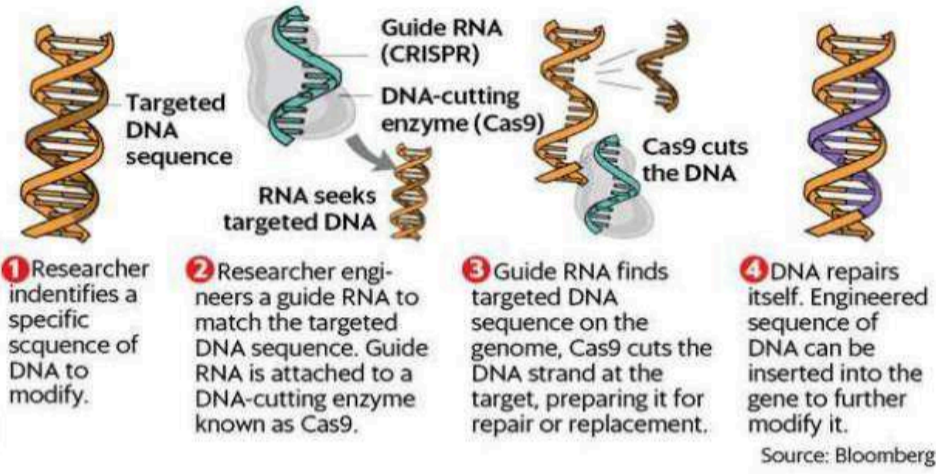
Explanation:

Nanotechnology

- ❖ Nanotechnology involves the manipulation and control of matter at the nanoscale, typically in the **range of 1 to 100 nanometers. (1 nm = 10^{-9} metres)**
- ❖ The **properties** of nanomaterials are **different** from those of micromaterials or bulk materials **due to their size and surface effects.**
- ❖ Concept behind nanotechnology is a research paper **“There’s Plenty of Room at the Bottom”** by physicist **Richard Feynman** in **1959.**
- ❖ The **term** nanotechnology was **coined** by Professor **Norio Taniguchi.**

How CRISPR-Cas9 works

Untill a few years ago, altering an organism’s genome was a cumbersome process, usually involving insertion of long strands of DNA or entire genes. Now scientists can cut and paste precise units of the genome.



22. What are “Arka Udaya, Arka Ambika, Arka Arunika” that have been in the news recently?
 (A) Hybrid crop variety of mango
 (B) Submarines
 (C) Galaxies
 (D) Hybrid crop of sunflower
 (E) Question not attempted

Answer: (A)

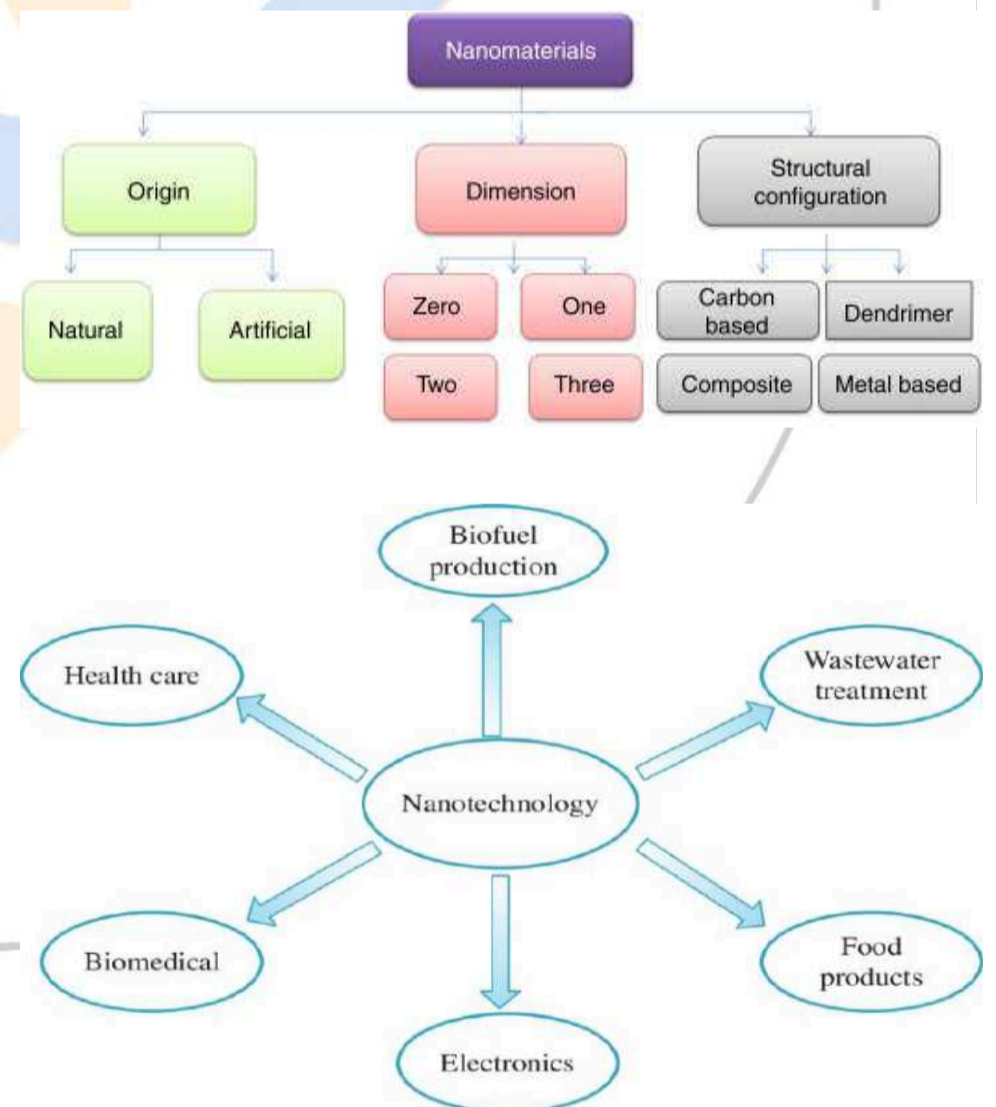
Explanation:

Arka Ambika - climate resilient hybrid mango
Arka Arunika - dwarf hybrid mango
Arka Udaya - hybrid mango

[Details of 109 varieties of Field and Horticultural crops which was released by Prime Minister Shri Narendra Modi on 11th August 2024](#)

Other important crop varieties

Pusa Vivek QPM 9	• First high vitamin-A maize hybrid
DMRH 1308	• A high yielding maize hybrid for wider adaptability
Girnar 5	• Rich in oleic acid hybrid groundnut
Virat (IPM 205-7)	• The world’s first extra early synchronous variety of mungbean
IPL 220	• Biofortified Lentil Variety
JRO 524	• Jute variety exported to Bangladesh
PSL-17	• Lentil



Nano Plastic

- ❖ Plastic particles < 5 mm (microplastics) < 100 nm (nanoplastics)
- ❖ Found in cosmetics, synthetic clothing, plastic bags and bottles



- ❖ **JAXA** will provide the **rover and launch vehicle**, while **ISRO** will provide the **lander**.

India and Japan have also collaborated on other space missions, including:

Chandrayaan-2: Guided Japan's SLIM mission to land on the Moon.

SLIM: Japan's robotic instrument that landed on the Moon with the help of Chandrayaan-2.

Chandrayaan 4

- ❖ **ISRO's proposed mission to collect lunar samples** from the lunar south pole and **bring back the same to the Earth**.
- ❖ **Components:** Ascender Module (AM), Descender Module (DM), Re-entry Module (RM), Transfer Module (TM), and Propulsion Module (PM)
- ❖ Launch vehicle: **Two separate LVM3**

Smart Lander for Investigating Moon (SLIM) or "Moon Sniper"

- ❖ **Japan's Moon landing mission** launched in January **2024**.
- ❖ The aim of the mission is **to examine a part of the Moon's mantle**. The SLIM lander landed near the **Shioli Crate**. The landing was a historic achievement for **Japan**, making it the **fifth country to soft-land a spacecraft on the moon**, after the **United States, the Soviet Union, China and India**.
- ❖ Japan's Lunar Exploration Program also includes other missions, such as the **uncrewed lunar orbiter SELENE (Kaguya)** and the canceled SELENE-2 mission.

32. Qubit refers to a two valued quantity used in
- Classical computers
 - Classical cryptography
 - Quantum computers
 - Lasers
 - Question not attempted

Answer: (C)

Explanation:

Quantum Computing

- ❖ Quantum computing is a new technology that uses quantum mechanics to solve complex problems faster than traditional computers.
- ❖ Quantum computers **use qubits as the basic unit of information, instead of bits**.

Terms related to Quantum Computing

Quantum Superposition	<ul style="list-style-type: none"> • Qubits can simultaneously exist in more than one location or quantum state at one time while remaining as a single entity. • Thus, superposition enables qubits to perform multiple operations simultaneously.
Quantum Entanglement	<ul style="list-style-type: none"> • State of one particle becomes linked with the state of the other, regardless of the distance between them. • Changes to the state of one particle affects the state of the other.
Quantum Coherence	<ul style="list-style-type: none"> • Quantum mechanics allows qubits to exist in a superposition state, where they can be 0 and 1 simultaneously.
Quantum Supremacy	<ul style="list-style-type: none"> • It is the point at which a quantum computer can complete a mathematical calculation that is beyond the reach of even the most powerful supercomputer. • In 2019, Sycamore (Google's quantum computer) claimed 'supremacy'.
Quantum Key Distribution	<ul style="list-style-type: none"> • QKD is a technology that uses the laws of quantum physics to distribute secure keys between two parties which prevent the decryption of data, and thus, ensure secure communication.
Majorana Zero Modes	<ul style="list-style-type: none"> • Exotic quasiparticles (not fundamental particles like electrons) that arise in certain types of topological superconductors. • They exhibit unique behaviour and possess topological degeneracy (inherent stability i.e, even if disturbed slightly, their overall quantum state remains unchanged, making them robust qubits for quantum computers).

33. Which of the following statements best describes the deployment plans for the Light Combat Helicopter (LCH)?

- It will be deployed in the desert regions for anti-armor warfare.
- It will be used for air defense missions in low-altitude regions.
- It is primarily used for maritime operations.
- It will be deployed in high-altitude areas like Ladakh.
- Question not attempted

Answer: (D)

Explanation: The LCH is specifically designed for **high-altitude conditions** and will be deployed in areas like Ladakh, making it **suitable for mountain warfare**.

LCH Prachand

- ❖ **India's first indigenous multi-role combat helicopter.**



Digiantra Research and Technology

- ❖ A **space tech startup** founded by Lovely Professional University alumni (Anirudh Sharma & Rahul Rawat) in 2018.
- ❖ It has developed **India's first In-orbit Space Debris Monitoring and tracking system**, which is based on LIDAR (Light Detection and Ranging) technology.
- ❖ It will provide global real-time earth coverage by deploying a constellation of cost-efficient nanosatellites in LEO (Low Earth Orbit) and a space-based air surveillance payload for accurate tracking of both aircraft and space objects.
- ❖ **India's first commercial Space Situational Awareness (SSA) Observatory** will be set up in the Garhwal region of Uttarakhand.

OKAPI Orbits

- ❖ Creating a **Space Situational Awareness Platform** providing services for safe satellite operations in an increasingly crowded space environment.

Agnibaan SubOrbital Technology Demonstrator (SOReD)

- ❖ Launched by IIT Madras based start-up **Agnikul Cosmos**
- ❖ **World's first rocket powered by a fully 3D-printed engine.**

Vikram-S

- ❖ **India's first privately built rocket** was launched on 18 November 2022 by **Skyroot Aerospace** from Sriharikota I
- ❖ The first **mission** of the rocket launch has been designated as '**Prarambh**'.

60. The terms "AWaRe, GLASS" often seen in the news are related to which of the following?

- (A) Antimicrobial resistance
- (B) Awareness programs to quit tobacco
- (C) Trans fatty acids
- (D) Consumer awareness campaign
- (E) Question not attempted

Answer: (A)

Explanation:

Antimicrobial Resistance (AMR)

- ❖ AMR occurs when **bacteria, viruses, fungi** and **parasites** evolve over time and **no longer respond** to antimicrobials (such as antibiotics, antivirals and antimalarials).

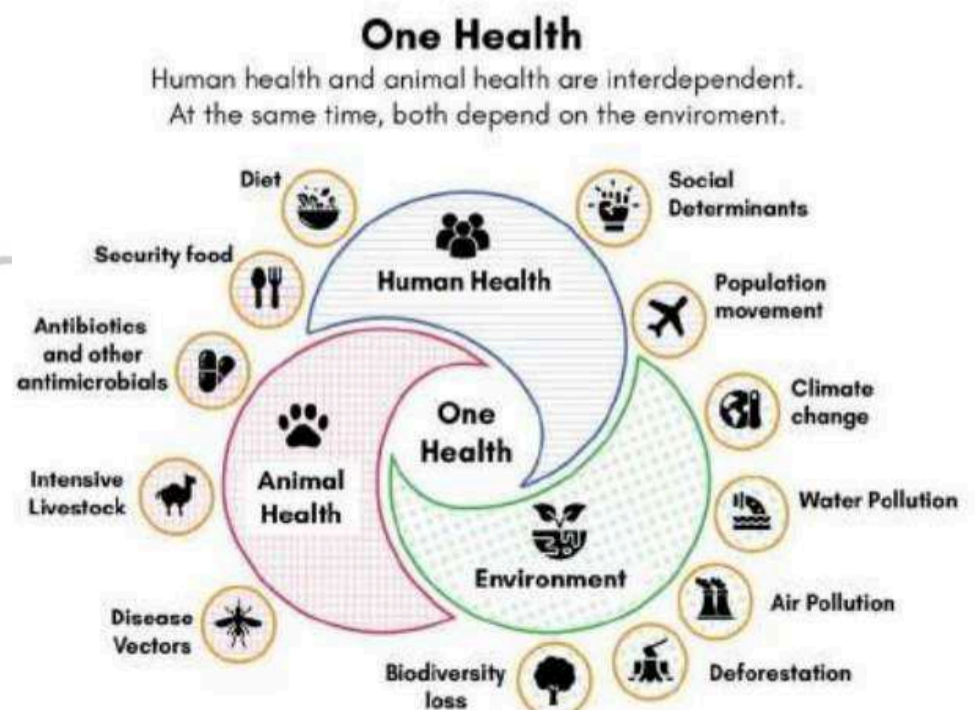
- ❖ **WHO** has declared **AMR** as one of the **top 10 global public health threats** facing humanity.
- ❖ **Causes of AMR** :
 - Over prescription, unregulated use of antibiotics
 - Adding excessive antibiotics to agricultural feed
 - Poor hygiene etc.

Efforts to control AMR

Steps by WHO against AMR	Steps by India
Global Action Plan on Antimicrobial Resistance (GAPAR)	National Action Plan on containment of Antimicrobial Resistance (NAP-AMR), 2017
AWaRe (Access, Watch, Reserve) Tool : To monitor and manage the use of antibiotics	Delhi and Chennai Declaration on AMR
Global Antimicrobial Resistance and Use Surveillance System (GLASS)	Red Line Campaign on Antibiotics. (MoH&FW)
	Schedule H1 to the Drugs and Cosmetics Act 1940.
	The National One Health Mission <ul style="list-style-type: none"> ● Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC) in 2022. ● Aim : coordinate across ministries in achieving overall pandemic preparedness and integrated disease control against priority diseases of both human and animal sectors.

Concept of One Health

- ❖ One Health is an approach that recognises that the health of people is closely connected to the health of animals and our shared environment.





Answer : (D)

Explanation :

Barak - 8 Missile

- ❖ Barak-8 is an **Indo-Israeli** jointly developed **surface to air missile (SAM) system**.
- ❖ Designed to defend against any type of airborne threat including aircraft, helicopters, anti-ship missiles, UAVs, ballistic missiles, cruise missiles and combat jets.
- ❖ Barak means 'Lightning' in Hebrew.
- ❖ Developed by - **DRDO** and **Israel Aerospace Industries**.
- ❖ Range : **70-100 Km**
- ❖ **Versions**
 - LR-SAM - Ship launch version
 - MR-SAM - Land launch version

QRSAM (Quick Range Surface to Air Missile)

- ❖ Short-range surface-to-air missile (SAM)
- ❖ Inducted into the Army and has a range of 25 to 30 km.
- ❖ Consists of two radars – Active Array Battery Surveillance Radar and Active Array Battery Multifunction Radar – with one launcher.

National Advanced Surface-to Air Missile System (NASAMS)

- ❖ Ground-based air defense system developed by Kongsberg Defence & Aerospace (KDA) and Raytheon.

76. Mitochondrial Donation Treatment is related to
- (A) Three parents baby
 - (B) Mitochondrial diseases from parent to child
 - (C) Only (A)
 - (D) Both (A) and (B)
 - (E) Question not attempted

Answer: (D)

Explanation:

Mitochondrial Donation Treatment (three parent baby)

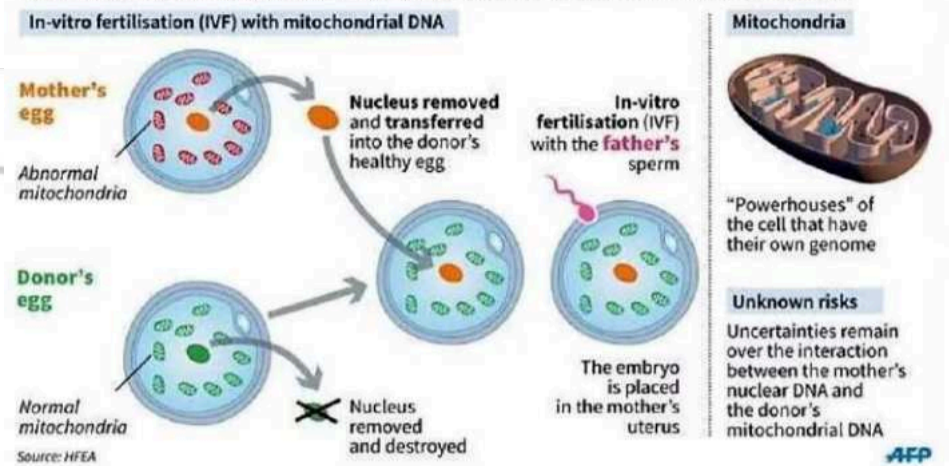
- ❖ A baby has been born using three people's DNA in the **UK** with help of Mitochondrial Donation Treatment (MDT) procedure. (**World's first**)
- ❖ Involves conceiving a child from IVF (in vitro fertilization) using the genetic material of the parents and the mitochondrial material of a donor.
- ❖ Diseased mitochondria are replaced by healthy mitochondria in order to avoid transfer of

mitochondrial diseases from the mother to the offspring. (**Either before or after in vitro fertilization of egg.**)

- ❖ **2 methods – pronuclear transfer, spindle transfer.**

Three-parent babies

The technique involves using DNA from three people in order to prevent serious inherited diseases



Mitochondrial DNA (Mt DNA)

- ❖ Mt DNA comes Only from the **mother**.
- ❖ Mitochondrial DNA is **more prone to mutations** compared to nuclear DNA. This is because mitochondria are exposed to free radicals generated during energy production, which can damage DNA.

Enzyme Replacement Therapy

- ❖ U.S. Food and Drug Administration (USFDA) recently gave nod to **world's first enzyme replacement therapy (ERT)**.
 - **Adzynma** - the first genetically engineered protein product for ERT.
 - For treating congenital thrombotic thrombocytopenic purpura (cTTP), a rare blood clotting disorder.

Cell-free DNA (cfDNA)

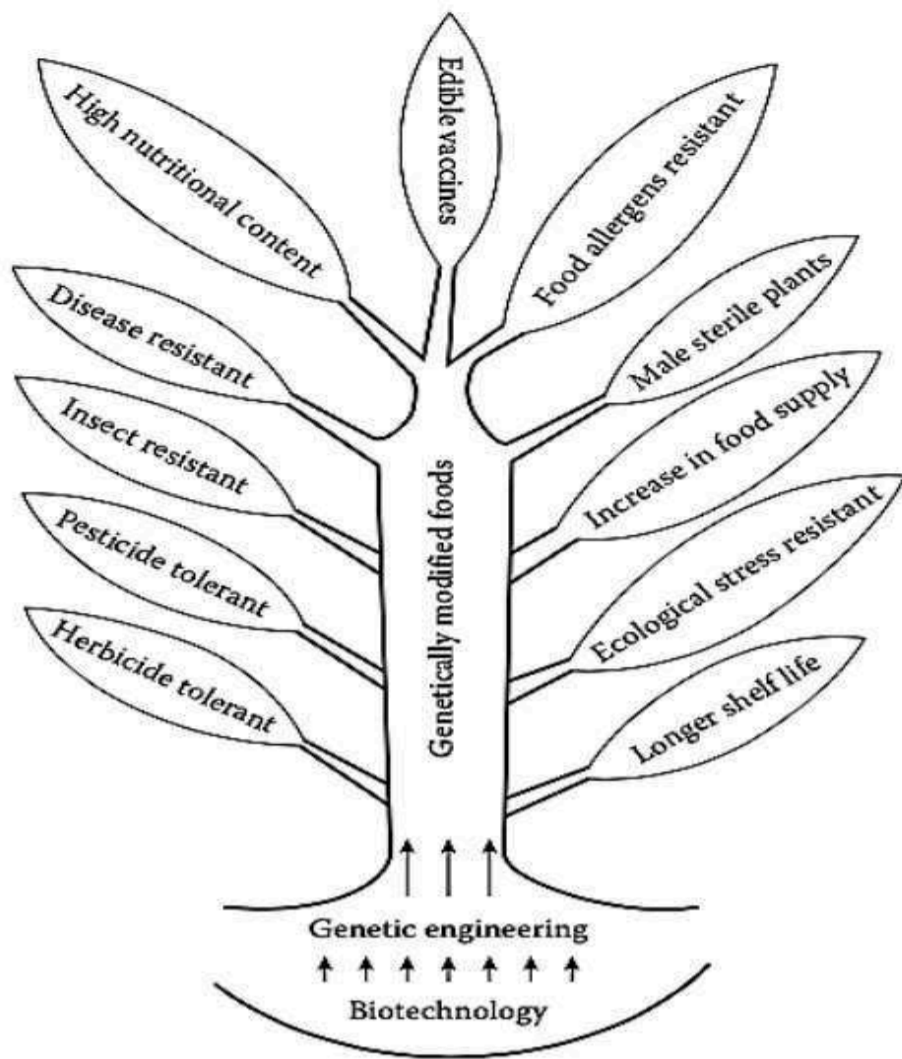
- ❖ Small fragments of nucleic acids that are released from cells and found outside the cell in body fluids as plasma, urine, and cerebrospinal fluid (CSF).
- ❖ cfDNA quantity in the blood increases under pathological conditions such as auto-immune diseases, cancer etc.

Applications

- Detect genetic abnormalities in foetuses.
- Early detection, diagnosis, and treatment of cancers.
- Monitor immune response after organ transplantation and can be used as a biomarker.

Designer Baby

- ❖ A designer baby refers to a human embryo that has been genetically modified, typically using techniques like CRISPR-Cas9, to influence traits



94. With reference to the 'Maya OS', consider the following statements:
1. It is an operating system developed by IIT Madras.
 2. It is an open-source Ubuntu-based operating system.
 3. It is powered by an endpoint detection and protection system called "Chakravyuh".
- Which of the following statements given above is/are correct?
- (A) Only 1 and 2
 (B) Only 1 and 3
 (C) Only 2 and 3
 (D) 1, 2 and 3
 (E) Question not attempted

Answer: (C)

Explanation:

Maya OS

- ❖ Maya OS is an **operating system**.
- ❖ **Developed by** experts from
 - Defence Research and Development Organisation (**DRDO**)
 - Centre for Development of Advanced Computing (**C-DAC**)
 - National Informatics Centre (**NIC**).
- ❖ The Indian **Defence Ministry** has decided to replace Microsoft's Windows with Maya OS on all its computers.

- ❖ It is an **open-source Ubuntu-based** operating system launched to prevent malware attacks by cybercriminals increasingly targeting critical infrastructure and government agencies.
- ❖ It is powered by an endpoint detection and protection system called "**Chakravyuh**".
 - Chakravyuh is an endpoint **anti-malware and antivirus software** that creates a virtual layer between the user and the internet, preventing hackers from accessing sensitive data

BharOS

- ❖ It is an **indigenous mobile operating system**.
- ❖ Developed by IIT Madras.
- ❖ It is a government funded AOSP (**Android Open-Source Project**) based operating system with no Google Apps or services.
- ❖ It comes with No Default Apps (NDA) and offers 'Native Over The Air' (NOTA) updates.

95. Consider the following statements regarding India's Ballistic Missile Defence System
1. Prithvi Air Defence System is designed to tackle shorter-range ballistic missiles above 15-30 Km in endo-atmospheric space.
 2. Pradyumna Missile is used in PAD system.

Which of the statements above given is/are correct?

- (A) Only 1
 (B) Only 2
 (C) Both 1 and 2
 (D) Neither 1 nor 2
 (E) Unanswered question

Answer: (B)

Explanation:

India's Ballistic Missile Defence System

- ❖ India's BMD shield has two interceptor missile systems - Prithvi Air Defence (PAD) and Advanced Air Defence (AAD).

High Altitude PAD Interceptors	Lower Altitude AAD Interceptors
<ul style="list-style-type: none"> • The Prithvi interceptors are designed to tackle longer-range ballistic missiles above (50-80 Km) altitudes in exo-atmospheric space. • Pradyumna Missile is used in PAD System. 	<ul style="list-style-type: none"> • The Advanced Air Defence missiles provide an additional interception layer engaging enemy missiles endo-atmospherically in the 15-30 Km altitude range. • Ashwin Interceptors are used in AAD.



- (A) 1-ii, 2-iii, 3-i, 4-iv
- (B) 1-i, 2-ii, 3-iii, 4-iv
- (C) 1-iv, 2-ii, 3-i, 4-iii
- (D) 1-i, 2-iii, 3-ii, 4-iv
- (E) Question not attempted

Answer: (D)

Explanation:

Generation	Period	Hardware	Example
1st	1940-50s	Vacuum tube	ENIAC, UNIVAC1, IBM 650
2nd	1950-60s	Transistor	IBM 1401, IBM 7090
3rd	1960-70s	Integrated circuit	IBM 360, IBM 370, PDP-11
4th	1970s-present	Microprocessor	STAR 1000, APPLE II
5th	Present and future	Artificial intelligence	Aurora, Frontier

108. Consider the following aircraft:

1. Rafale
2. Mig-29
3. Tejas Mk-1
4. Sukhoi-30 MKI

How many of the above are considered fifth generation fighter aircraft?

- (A) Only one
- (B) Only two
- (C) Only three
- (D) None
- (E) Question not attempted

Answer: (D)

Explanation:

Fifth generation fighter aircrafts

- ❖ These are equipped with stealth technology.
- ❖ Examples:
 - India - AMCA
 - USA - Raptor or F-22, Lighting-II or F-35
 - Russia - Sukhoi Su-57
 - China - Chengdu J-20, Shenyang FC-31

109. INSACOG is a

- (A) A Vaccine
- (B) Consortium of national labs
- (C) A coalition of Govts on Biofuel
- (D) Environmental group of BRICS countries
- (E) Question not attempted

Answer: (B)

Explanation:

INSACOG	<ul style="list-style-type: none"> ● By Deptt of Biotechnology (M/o S&T) + MoH&FW ● Consortium of national labs to monitor genomic variations of SARS-Cov2
GAVI Alliance	<ul style="list-style-type: none"> ● Global partnership with the goal of increasing access to immunization in poor countries
Coalition for Epidemic Preparedness Innovations (CEPI)	<ul style="list-style-type: none"> ● Global partnership launched in 2017 to develop vaccines to stop future epidemics ● India – founding member
Indian Biological Data Centre (IBDC)	<ul style="list-style-type: none"> ● India's first national repository for life science data ● At Faridabad, Haryana ● Department of Biotechnology (DBT) ● Storage at 'Brahm' High-Performance Computing (HPC) facility (4 Petabytes)
Bio-Grid	<ul style="list-style-type: none"> ● National Repository for biological knowledge, information and data. ● Under Biotech-PRIDE Guideline

110. Arrange the following products/examples of nanotechnology in ascending order of the four generations of nanotechnology [I → IV] and select the correct answer using the codes given below :

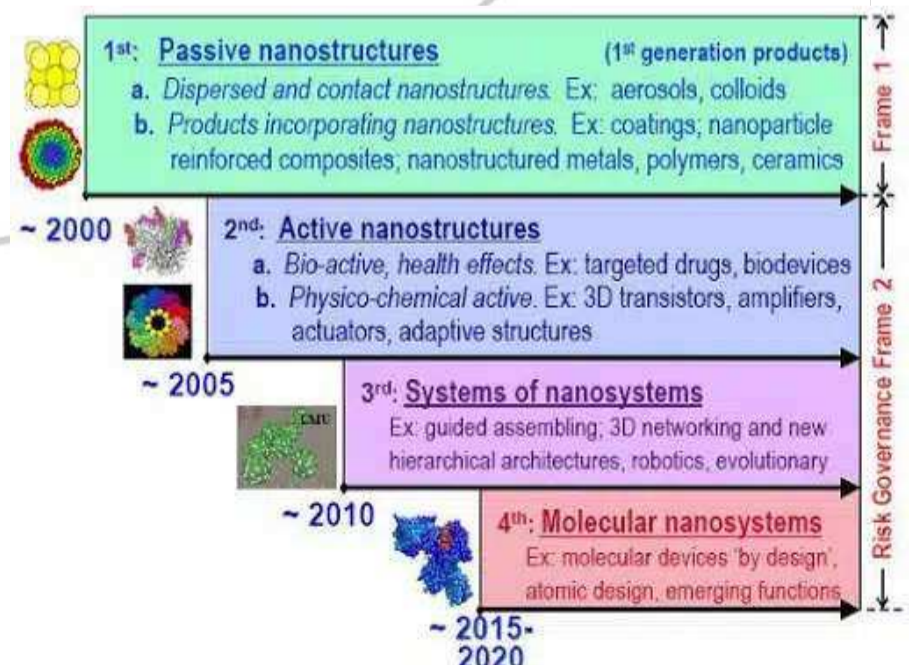
1. Colloids
2. 3D transistors
3. Robotics
4. Molecular manufacturing

Codes :

- (A) 1,2,3,4
- (B) 4,1,2,3
- (C) 1,4,2,3
- (D) 4,1,3,2
- (E) Question Not Attempted

Answer: (A)

Explanation:





Solid	Solid	Solid Sol	Coloured gemstone, milky glass
-------	-------	-----------	--------------------------------

❖ Suspension

- Heterogeneous mixture
- Particles can be seen with naked eye
- particles of suspension scatter a beam of light passing through it and make its path visible

❖ Solution

- ❖ Homogeneous mixture of two or more substance
- ❖ Eg soda water , lemonade ,Air , alloys , Iodine in alcohol (tincture of iodine), sugar in water
- ❖ Solution = solvent(larger amount) + solute(lesser quantity)

141. Consider the following disorders.

1. Turner syndrome
2. Patau syndrome
3. Klinefelter syndrome
4. Down syndrome
5. Edward syndrome

Which of the following diseases is caused due to change in the number of autosomes ?

- (A) 1, 2, 4 and 5
 (B) 2,3,4 and 5
 (C) 2,4 and 5
 (D) 1,3,4 and 5
 (E) Question not attempted

Answer - C

Explanation

- ❖ **Autosomal abnormalities**
- ❖ **Mongolism or Down-syndrome** -. Scientists found that a person suffering from Mongolism or Down-Syndrome has 47 chromosomes which are due to one additional chromosome in 21 pair (Trisomy of 21 st chromosome).
- ❖ symptoms- Broad cranium of child, short neck, flat hands, and stubby fingers, always opened mouth, lower lip budging below, tongue also sticks out of mouth, and less developed intellectual ability.
- ❖ **Edward-syndrome** - This abnormality is due to addition of one additional chromosome in the 18th pair.
- ❖ Different structural abnormalities- comparing with 45 chromosomes due to deletion of smaller arm of chromosome number 5, **cri-du-chat syndrome** is caused.
- ❖ **Patau syndrome** - trisomy in 13 th pair of chromosome
- ❖ **Abnormalities related to sex chromosomes**

- ❖ **Turner-Syndrome** - This person is always female. This female has Only one x chromosome instead of two. Their chromosome number is 45 (44+XO). It is called Turner's syndrome. Main symptoms of this are- Mentally retarded, weblike skin on neck, imperfectly developed breast

- ❖ **Klinefelter-syndrome**- This disease is caused in males. Their cells may have 47,48 or 49 chromosomes rather than 46. This additional number may be of X or Y chromosome.

142. Match the following and select the best match from the codes given below

List -1(Deficiency of Vitamin,mineral,protein)

1. Protein
2. Vitamin C
3. Iodine
4. Vitamin B3

List - 2(disease caused)

- A. Goiter
- B. Pellagra
- C. Kwashiorkor
- D. Scurvy

Codes

- (a) 1-C, 2-D, 3-A, 4-B
 (b) 1-C, 2-D, 3-B, 4-A
 (c) 1-D, 2-B, 3-D, 4-A
 (d) 1-A, 2-D, 3-B, 4-C
 (e) Question not attempted

Answer =A

Explanation

Vita min	Chemical name	Disease caused by their deficiency
A	Retinol	Night blindness xerophthalmia(dry eye)
D	Calciferol	Rickets disease
E	Tocopherol	Infertility, paralysis
K	Naphthoquinone Phylloquinone	Bleeding, No formation of blood clot.
B	Thiamine	Beriberi disease
B2	Riboflavin	Cracking in corners of mouth (Cheilosis)
B3	Nicotinic acid	Pellagra disease
B5	Pantothenic acid	Burning feet syndrome
B6	Pyridoxine	Dermatitis (Skin disease)
B12	Cyanocobalamin	Pernicious anaemia



- ❖ While the 10-km rule is implemented as a general principle, the extent of its application can vary..
- ❖ Prohibited Activities: Commercial mining, saw mills, industries causing pollution (air, water, soil, noise etc), establishment of major hydroelectric projects (HEP), commercial use of wood
- ❖ Sariska-Alwar, Ranthambore-Sawai Madhopur and National Chambal Ghadiyal Sanctuary-Kota will be marked as eco-sensitive zones.
- ❖ Note: Jaisamand-Udaipur, Kesarbagh-Napur, Keoladeo-Bharatpur and Nahargarh-Jaipur have already been declared eco-sensitive zones in Rajasthan.

182. Which of the following is not correctly matched regarding Application and principle on Which they are based ?

- (A) RO purifier- Reverse osmosis
- (B) Hydraulic brake - Archimedes principle
- (C) Optical fiber - Total internal reflection
- (D) Transformer - electromagnetic induction
- (E) Question not attempted

Answer:- B

Explanation

- ❖ Hydraulic brake works on pascal law
- ❖ **Pascal law for pressure of liquid**
- ❖ If gravitational attraction is negligible, in equilibrium condition, pressure is same at all points in a liquid.
- ❖ If an external pressure is applied to an enclosed fluid, it is transmitted undiminished to every direction.
- ❖ Hydraulic lift, hydraulic press, Hydraulic brake work on Pascal law.
- ❖ **Reverse osmosis (RO)** is a process that uses a semipermeable membrane to remove ions, molecules, and larger particles from a solution. The semipermeable membrane consists of a thin layer of polymers capable of rejecting the target material by applying pressure, whereas the rest of the water can pass through unhindered.
- ❖ RO water purifier works on this principle .
- ❖ **Electromagnetic induction:** Whenever there is change of magnetic flux linked with a circuit, an emf is induced in the circuit. This phenomenon is called electromagnetic Induction. The emf so developed is called induced emf and the current

so generated (if circuit is closed) is called induced current.

- ❖ Direction of induced current is determined with the help of Fleming's right hand rule or Lenz law.
- ❖ Transformer: Transformer is a device which converts low voltage A.C. into high voltage A.C. and high voltage A.C. into low voltage A.C. It is based on electromagnetic induction and can be used only in case of alternating current.
- ❖ A.C. Dynamo (or generator) works on the principle of electro-magnetic induction.
- ❖ **Total Internal Reflection** : If light is propagating from denser medium towards the rarer medium and angle of incidence is more than critical angle, then the light incident on the boundary is reflected back in the denser medium, obeying the laws of reflection. This phenomenon is called total internal reflection as total light energy is reflected, no part is absorbed or transmitted.
- ❖ For total internal reflection,
- ❖ Light must be propagating from denser to rarer medium.
- ❖ Angle of incidence must exceeds the critical angle.
- ❖ Optical Fibre: Optical fibre consists of thousands of strands of a very fine quality glass or quartz, light is propagated along the axis of fibre through multiple total internal reflection, even though the fibre is curved, without loss of energy.
- ❖ **Applications:**
- ❖ For Transmitting optical signals and the two dimensional pictures.
- ❖ For transmitting electrical signals by first converting them to light.
- ❖ For visualising the internal sites of the body by doctors in endoscopy.

183. Alzheimer , Parkinson disease are classified under which of the following categories of disorders ?

- (A) Exogenous chemical disorder
- (B) Infectious diseases
- (C) Neurodegenerative diseases
- (D) Autoimmune diseases
- (E) Question not attempted

Answer:- C

Explanation

- ❖ Neurodegenerative disorder
- ❖ **Parkinson's Disease**



248. Consider the following statements about sustainable development .

1. The concept of sustainable development was defined in the Brundtland report published in 1987.
2. The United Nations adopted SDG goals in the 75 th session of the UN general assembly .
3. United Nation Conference on sustainable development held at Rio in 2012.
4. The national conference on accelerating SDG held at New Delhi on 4,5 march 2024.

Which of the following statements given above are correct?

- (A) 2,3 and 4
- (B) 2 and 4
- (C) 1,2 and 3
- (D) 1 and 3
- (E) Question not attempted

Answer:- D

Explanation

- ❖ The definition of Sustainable Development was given by the Brundtland Commission in its report Our Common Future (1987).
- ❖ In June 1992, at the Earth Summit in Rio de Janeiro, Brazil, Agenda 21 was adopted, a comprehensive plan of action to build a global partnership for sustainable development.
- ❖ At the Millennium Summit in September 2000 at UN Headquarters in New York. Eight Millennium Development Goals (MDGs) set to reduce extreme poverty by 2015.
- ❖ World Summit on Sustainable Development in South Africa in 2002 , The Johannesburg Declaration on Sustainable Development reaffirmed the global community's commitments to poverty eradication and the environment protection
- ❖ At the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil, in June 2012, Member States adopted the outcome document "The Future We Want"
- ❖ In 2013, the General Assembly set up a 30-member Open Working Group to develop a proposal on the SDGs.
- ❖ The 70th session of the United Nations General Assembly (UNGA) in 2015 adopted the Sustainable Development Goals (SDGs): the resolution, adopted on September 25, 2015, is titled

- ❖ "Transforming our world: the 2030 Agenda for Sustainable Development with its 17 SDGs was adopted at the UN Sustainable Development Summit in New York in September 2015
- ❖ The 'National Conference on Accelerating Sustainable Development Goals' was held in Jaipur on 4-5 March 2024.
- ❖ Organizer: The conference was organized by NITI Aayog in partnership with the host Government of Rajasthan and technical partners UNDP and United Nations in India.
- ❖ During the conference, Rajasthan Chief Minister Bhajan Lal Sharma launched three knowledge portals -
- ❖ UNDP's 'SDG Knowledge Hub',
- ❖ Rajasthan Government's 'Food and Nutrition Security Analysis Dashboard'
- ❖ 'SDG-2 (Zero Hunger) Dashboard'.

249. In the context of permissible noise level, Noise level allowed in residential areas during day and night time respectively?

- (A) 55 decibel and 45 decibel
- (B) 65 decibel and 55 decibel
- (C) 60 decibel and 50 decibel
- (D) 50 decibel and 40 decibel
- (E) Question not attempted

Answer:-A

Explanation

Permissible noise level

Noise level	Day time	Night time
Industrial	75 decibel	70 decibel
commercial	65 decibel	55 decibel
residential	55 decibel	45 decibel
Silent Zone	50 decibel	40 decibel

250. Consider the following statements regarding Indicators of pollution .

1. In areas of high Sulphur dioxide, Lichens will be larger and more brushy.
2. Increased pollutants or fertilizers in water leads to an increase in the number of stonefly Larvae.
3. Bloodworms or sludgeworm's presence in water indicates water pollution.

Select the most appropriate Answer from the codes given below?

- (A) Only 1 is correct, 2 and 3 are incorrect.
- (B) Only 2 and 3 are correct, 1 is incorrect.